

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Status of the Claims

New claims 14-32 are presented. Claims 1-2, 4-6, 8-13 are currently amended. Claims 3 and 7 are requested to be cancelled. This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claims remain under examination in the application, is presented, with an appropriate defined status identifier. Upon entry of this amendment, claims 1-2, 4-6, and 8-32 are pending in this application.

Support for the amendments is provided in the specification and the amendments do not present new matter. Specifically, support for the amendments to claims 1, 4 and 11 is provided, for example, at paragraph [0024]. Support for the amendments to claims 9 and 12 is provided, for example, at paragraph [0015]. Other amendments correct minor typographical errors or serve to make the claims conform with claiming conventions.

Support for the newly added claims is provided in the specification and these claims do not add new matter. Specifically, support for newly added claims 14 and 25 is provided, for example, at paragraphs [0015] and [0059]. Support for newly added claim 15 is provided, for example, at paragraph [0014]. Support for newly added claims 16, 17, 26, and 27 is provided, for example, at paragraph [0019], Table 3, and Figure 3. Support for newly added claims 18-19 and 28 is provided, for example, at Table 3. Support for newly added claims 20-21 and 29-30 is provided, for example, at paragraph [0011] and [0014]. Support for newly added claims 22 and 31 is provided, for example, at paragraphs [0024] and [0049]. Support for newly added claim 23 is provided, for example, at paragraphs [0015] and [0054]. Support for newly added claims 24 and 32 is provided, for example, at paragraphs [0014] and [0031].

Claim Objections

Claims 4 and 11 are objected to, because the recitation of “the substrate” lacks antecedent basis. The current form of the amended claims obviates this objection.

Claim Rejections under 35 USC § 103

Rejection of claims 1-4 and 8-13 over Fraatz in view of Applicants’ specification

Claims 1-4 and 8-13 stand rejected under 35 USC § 103(a) as allegedly obvious Fraatz (US Patent No. 5,372,936) in view of Applicants’ background discussion at paragraphs 4-5. The current form of the amended claims obviates this rejection.

Independent claims 1, 4, 11 are amended to recite that the fluorescent biomarkers are inherent biomarkers. The combination of cited references does not teach or suggest a real-time biofilm monitoring system or a method for detecting fouling organisms that detects fluorescence from inherent biomarkers of fouling organisms. To establish a prima facie case of obviousness, the U.S. Patent and Trademark Office must meet three basic elements:

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

Manual of Patent Examining Procedure, 8th ed., (M.P.E.P.) § 2142. The evidence and explanation of record does not establish that the combined reference teachings discloses or suggests all the claim elements.

Claims 1-2

Fraatz in combination with the Applicants’ background discussion does not teach or suggest a system that detects inherent biomarkers as recited in amended claims 1-2 (claim 3 is not addressed, because it has been cancelled). The Office Action asserts that “it would have been obvious to one of ordinary skill in the art at the time the invention was made to use Fraatz’s real-time monitoring system in order to measure fouling organisms in water in order to determine the amount of contamination.” Office Action at page 3. However, Fraatz

does not teach or suggest a real-time monitoring system “that detects wavelength specific fluorescence from biomarkers” as asserted in the Office Action.

Fraatz discloses “a sensor and apparatus for detecting biological activities in a specimen” which uses “a sealable container [that] is sealed with a culture medium therein into which the sample is introduced.” Abstract (emphasis added). Specifically, Fraatz teaches:

continuously measuring the concentration of at least one (produced or consumed) substance subject to conversion by metabolic processes, generating a test signal by way of optodes in direct contact with the substances to be assessed, and monitoring the changes over time of the test signal or signals to serve as an indicator for the presence of microorganisms

Col. 2, lines 59-65. Fraatz teaches monitoring biological activity in a container that contains a culture medium.

The present specification clearly differentiates the claimed system from a method such as that of Fraatz stating:

The method and apparatus of the present invention exploit biomarkers that are inherent to bacteria, so that no reagents or sample preparation are required. Because there are no competing reagents, multiple biomarkers can be detected with one probe.

Paragraph [0026]. Thus, Fraatz does not teach or suggest a system that detects fluorescence from inherent biomarkers of any microorganism. Nothing in the Applicants’ background remedies Fraatz’s deficiency.

Therefore, Fraatz in view of Applicants’ background discussion at paragraphs 4-5 does not render claims 1-2 obvious and unpatentable. Accordingly, Applicants respectfully request withdrawal of this rejection.

Claims 4 and 8-13

The combined teachings of Fraatz in view of Applicants’ background discussion also do not teach or suggest all of the elements of amended claims 4 and 8-13. Fraatz does not teach or suggest a method for detecting a fouling organisms (amended independent claim

4) or a plurality of fouling organisms (amended independent claim 11) comprising detecting fluorescence of an inherent biomarker. As discussed above, Fraatz teaches a method for detecting biological activity which employs a container with a culture medium capable of sustaining growth of microorganism exhibiting a metabolic activity which alters the concentration of a substance in the medium mixture. See, e.g., col. 2, lines 59-65, col. 3, lines 44-56, col. 14, lines 5-29. The method taught in Fraatz involves adding a sensor containing a fluorophore whose emitted radiation is modulated by the substance produced (or consumed) by the substance produced (or consumed during the metabolic activity. Fraatz also teaches the use of a culture medium. As discussed above, the claimed method does not require addition of reagents. Paragraph [0026].

Additionally, Fraatz does not teach or suggest introducing excitation light into a plurality of first sides of a plurality of bifurcated optical fiber bundles directed at a sample, wherein the excitation light can be the same or different for each first side of the bifurcated optical fiber bundles, obtaining emissions arising from a substrate through second sides of a plurality of bifurcated optical fiber bundles, and detecting the emission from the substrate and correlating this emission to the presence or absence of fouling organisms, as recited in independent claims 4 and 11.

Applicants' background discussion at paragraphs 4 and 5 does not remedy Fraatz's deficiencies. Therefore, the combined references do not teach or suggest all elements of claims 4, 8, and 11 and cannot support a prima facie case of obviousness. Claims 8-10 and 12-13 depend direct or indirectly from independent claims 4 and 11 and, thus, also are patentable. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 4 and 8-13.

Rejection of claims 5-7 over Fraatz in view of Applicants' specification and further in view of Davison

Claims 5-7 are rejected over Fraatz in view of Applicants' background discussion and further in view of Davison (US Patent No 6,755,074). The current form of the amended claims avoids this rejection.

Claims 5-6 (claim 7 is not addressed, because it has been cancelled) depend, directly or indirectly, from claim 1. As discussed with respect to claims 1-2, Fraatz in combination with Applicants' background discussion does not teach or suggest a system

that detects fluorescence from inherent biomarkers of fouling organisms. Davison's disclosure regarding using a blank flow cell to allow "background optical noise and drift subtraction" does not remedy the deficiencies of the combination of Fraatz and Applicants' background discussion. Thus, the combined cited references does not render claims 5-6 obvious and unpatentable. Accordingly, Applicants respectfully request withdrawal of this rejection.

Newly Added Claims

Newly added claims 14-18 depend from claims 1 and 4, and, thus, also are patentable for the reasons discussed for claims 1-3 and 5-7.

CONCLUSION

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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